Multispectral Thermal Imager
Experiment Proposal Instructions

I. Program Information

The Multispectral Thermal Imager

- The Multispectral Thermal Imager (MTI) is a research and development satellite that carries a multispectral earth-imaging payload. The purpose of MTI is to demonstrate and evaluate multispectral and thermal imaging technology for nonproliferation treaty monitoring and other applications of interest to the U.S. government. The satellite is designed to collect radiometrically calibrated images in 15 spectral bands ranging from 0.45 to 10.70 micrometers (visible through long wave infrared); ground sample distances are 5 meters in the four shortest wavelength bands and 20 meters in the remaining bands. The combination of spectral bands, very accurate radiometry, and good spatial resolution make MTI unique among space-based imaging systems. The MTI program is sponsored by the U.S. Department of Energy (DOE) and conducted by Sandia National Laboratories (SNL), Los Alamos National Laboratory (LANL), and Savannah River Technology Center (SRTC).
- MTI is expected to be operational for approximately three years from launch in March 2000. It is capable of collecting an average of six, two-look images each day. Its near-polar sun-synchronous orbit results in images being collected at approximately midnight and noon local time.

II. Experiment Proposals

Proposal Process

- The MTI satellite has limited availability for tasking and for data analysis by individuals and teams that are not formally part of the MTI teams at SNL, LANL, and SRTC. Two avenues are open for experiment requests:

A. DOE Experiments Committee

This committee accepts and prioritizes submissions for activities that benefit the Department of Energy Office of Nonproliferation and National Security (DOE/NN-20) or the MTI mission. The MTI mission includes thermometry, atmospheric corrections, high accuracy calibrations, and signatures of proliferation of weapons of mass destruction. A small committee has been established to evaluate proposals for MTI utilization that benefits the DOE. Committee members are:

- Dr. Steven C. Bender (chair), LANL, 505-667-4944, sbender@lanl.gov
- Dr. Brian R. Stallard, SNL, 505-844-2631, brstall@sandia.gov
- Dr. Alfred Garrett, SRTC, 803-725-4870, alfred.garrett@srs.gov

B. MTI Users Group (MUG) Experiments Committee

This committee accepts and prioritizes submissions for activities that fall outside the purview of the DOE Experiments Committee. The MTI program seeks to demonstrate a wide variety of applications. Highest priority will be given to projects that are clearly relevant to national interests. A Central MASINT Organization (CMO) Spectroradiometric Working Group committee ranks the MUG proposals. DOE experimenters are not excluded from submitting proposals through this channel. Potential users should contact one of the following to obtain experiment proposal forms:

- Mr. Tom Stueber (MTI Technical Liaison Alternate), SNL, 505-844-7236, tfstueb@sandia.gov
- Mr. Paul E. Lewis (chair), CMO, 703-591-8546 ext. 280, fax 703-591-2437 (no email)

- The fraction of experiments allocated to DOE and MUG is expected to vary over the lifetime of the satellite. During the initial portion of the on-orbit time, DOE experiments are expected to consume approximately 60 – 70 percent of the capacity of the satellite, decreasing to approximately 30 percent near the end of the period. MUG experiments will account for the remaining capacity.
- Final MTI tasking is approved by the DOE MTI Program Manager, Mr. Randy Bell, who receives prioritized proposals from the following two committees, which operate in parallel.

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Eligibility for Proposal Submission

- Each Principal Investigator (PI) must be a U.S. citizen and will generally be a government employee or researcher affiliated with a government project. Questions regarding eligibility can be answered by the contacts above.

Proposal Deadlines

- MUG proposals are prioritized on an approximately quarterly calendar basis. For specific due dates contact the MTI Technical Liaison.

Proposal Selection Notification

- Principal Investigators (PIs) are notified of prioritization results within two weeks of the prioritization meetings.

III. Proposal Instructions

General Information

- Provide Principal Investigator (PI) contact information, including title (Dr., Maj., Ms., etc).
- Identify government sponsor(s) and funding source(s), name and organization, if appropriate.
- Identify any MTI Team collaborators and collaborating organizations.

Experiment Overview

- **Description** Describe the proposed work in about one-half to one-and-one-halfpages, including the scientific basis, previous work, expected results, novelty, references, etc.
- **Benefits to DOE and MTI Mission** Provide a paragraph describing how the experiment would enhance or extend the capability of the MTI mission

OR

- **National Interest** Provide a paragraph explaining the relevance and impact of the proposal on the national interest.

Experiment Location

- Provide geographic coordinates of scene center. The absolute pointing accuracy of MTI is approximately ±2km and the nominal image size is 12 km by 12 km. If you require georeferenced data, also specify control points in the imagery to the best accuracy possible, preferably 1meter or less.

Imaging Constraints

- Specify time of year or desired dates/frequency as appropriate. The typical revisit time is 7 to 21 days. Call for specific information.
- Indicate if the image collection is required to be night, day, or both. Images are collected at approximately midnight and noon local time.
- Specify any view angle constraints. Image quality is best for a side-to-side roll of up to ±20 degrees off nadir.
- Indicate any special weather constraints, e.g., maximum acceptable percentage of cloud cover.
- Specify any advance notification or other coordination that is desired. Image tasking is performed every two weeks covering collections to be performed during the following two weeks.

Imaging Requirements

- Indicate desired bands. Unless otherwise specified, daytime images are collected in all bands; nighttime images are collected in bands J through N only.
- Specify whether imaging with one or two looks. MTI has two imaging scenarios:
  1) a one-look imaging scenario at near nadir, fixed 12 km width, and variable length. MTI's standard image length is nominally 12 km, but image lengths up to 4 times the nominal standard length may be

requested. If a one-look image is desired specify the length of the image in multiples of 12 km up to 48 km.

2) a two-look imaging scenario in which the first image is acquired at near nadir, and a second image is acquired looking back at the site by pitching 50 to 55 degrees off nadir. The first image has a width and length fixed at 12 km, and the second image has dimensions larger than 12 km while maintaining a length-to-width aspect ratio of approximately 1:1.

Data Processing and Distribution

- All MTI images are owned by the DOE.
- Data product standard format is HDF on CD-ROM.
- Indicate the desired data products. Data processing through Level 1B-Coreg is recommended and is provided at no cost. Other standard and non-standard products are available through DPAC, or users can work from the Level 1 products. More information and access to DPAC products are available by contacting the DPAC Team Leader, James B. Krone (505-667-7457, jkrone@lanl.gov) or any of the DPAC data analysts: Kim Pollock (505-667-7609, kpollock@lanl.gov); Kim Starkovich (505-665-0944, kstarkovich@lanl.gov); Meg Kennison (505-667-8482, mkennison@lanl.gov) or Jackie Mondragon (505-665-3053, jmondragon@lanl.gov).

Ancillary Data

- Experiments that include ground truth or other ancillary data (e.g., underflight by airborne sensor) are preferred, but not required. Describe in a paragraph or so what ground truth or other ancillary data will be collected. It is expected that these data will be shared with the three participating DOE labs.

Data Analysis and Formal Reporting

- Briefly summarize the data analysis to be performed. The data produced in the proposed work are expected to be shared with the three participating DOE labs.
- State how the results of the proposed experiment will be documented. The procedure to gain approval for publication of MTI data is described in the signed agreement. A repository will be established for all papers, talks, and reports produced. PIs are expected to contribute to this repository.

No Foreign Involvement

- Access to MTI data is limited by export control laws and potentially other restrictions. Hence, only U.S. citizens may have access to unpublished data. To ensure compliance, an access list must be provided and approved as a part of this application process. Note that the access list may be augmented as described in the signed agreement.

Other

- Use this section to provide additional information that may be pertinent to selection, prioritization, or operations.

III. Proposal Submission

Send:

1) by surface mail or fax, a signed MTI Experiment Proposal Agreement
2) by surface mail or fax, a printed copy of the completed MTI Experiment Proposal

   OR

   an electronic copy of MTI Experiment Proposal in Microsoft Word using either e-mail or floppy diskette

   to:

Mr. Thomas F. Stueber
Sandia National Laboratories
PO Box 5800 MS0968
Albuquerque, NM 87185-0968

Phone (505) 844-7236
Fax (505) 844-4155
Email tfstueb@sandia.gov